

# INTELLIGENT MUNITIONS SYSTEM

By Dean Risseuw and Todd A. Kulik

**T**oday's network-centric battlefield presents a host of new challenges—for warfighters as well as designers and manufacturers in the defense industry. The need to keep pace with rapidly changing requirements is always there, whether it means coming up with ground-breaking weapons solutions or finding innovative ways of leveraging existing technologies to meet new demands—necessary in order to develop the Intelligent Munitions System (IMS), a network of sensors and munitions that provides the soldier with the capability to detect and engage threat vehicles and threat personnel while keeping fellow soldiers and friendly forces out of harm's way and minimizing noncombatant casualties. All FCS (Future Combat Systems) programs are about empowering frontline soldiers with actionable information to minimize their risk while enhancing their operational effectiveness.



Currently, IMS is the only wide-area, top-attack ground-based solution that delivers such a high level of target effectiveness. It is the culmination of work completed on a variety of programs and concepts over the years at Textron Systems. Ellen Lord, the company's vice president of Intelligent Battlefield Systems, points out that although IMS is a totally new concept, it uses much of the best of what has been developed for programs such as sensor fuzed weapon (SFW), Spider and urban and tactical unattended ground sensors for FCS.

The IMS attack mechanism is based on battle-proven SFW, first used in Iraq in 2003. In addition, IMS uses the same sensor capabilities as Textron's FCS unattended ground sensors—sensing nodes, networked together, that can identify a broad range of targets and feed that vital information to the warfighter. IMS also uses radar to help with target engagement. Through a unique blend of detailed sensor intelligence and precision munitions, IMS facilitates classification and destruction of vehicles, from light-wheeled through heavy-tracked, as well as dismounted personnel.

IMS is easy to deploy. It is a compact munition system that can be easily transported and emplaced by two soldiers. It can be powered up, loaded with data, armed and ready to engage targets in less than five minutes, and thus prepared to engage any enemy within its wide lethal coverage area. Because it is always under the control of an operator who sets the rules of engagement, safety is ensured when friendly forces or noncombatants are passing within range. In addition,

*The intelligent munitions system (IMS) can sense the enemy's presence on the battlefield and can also collect battlefield data and relay it to an operator (inset).*



IMS will have self-destruct and self-deactivation capability, which will ensure that no residual hazard to noncombatants will remain on the battlefield after hostilities cease.

Each battery-powered IMS munitions system contains more than one Skeet or sub-munition, each of which can stop virtually any wheeled or tracked vehicle. The system's sophisticated sensor suite ensures multimode data fusion to provide transmission of the most accurate information possible to the control station, where engagement decisions are made. The sensor suite will detect and classify vehicles beyond 100 meters. When added coverage is needed, several IMS munitions systems can be used together in one area. They will share data with each other and the control station operator, for optimal awareness.

**O**nce a strike decision is made and an attack mode is chosen, programmed logic in the munition determines which Skeet to deploy. The Skeet is propelled upward and assumes a spinning motion that allows its sensors to scan the ground in a widening circular pattern until the target is located. Since additional Skeets are still on board, they are immediately available for deployment against follow-on vehicles. This top-attack approach, launched from a low-to-the-ground, camouflaged position, gives the advantage of surprise and a big effect.

When the mission is complete, the IMS munitions system can easily be disarmed and retrieved. Any remaining unexploded munitions are destroyed remotely, leaving no unexploded ordnance on the battlefield.

The true multienvironment capabilities of IMS are demonstrated in its effectiveness in urban as well as open-terrain scenarios. In a congested street setting, just one IMS munitions system enables control of two parallel streets.

According to Kevin Twohig, senior principal engineer at Textron Systems, the key IMS advantage to warfighters is its utility. "It gives soldiers the performance they're looking for in today's battlefield setting," Twohig explains. "From a logistics standpoint, it requires less tonnage and manpower than the previous systems."

Henry Finneral, Textron's IMS program manager, says that IMS combines many functions to provide a solution that's easy for the user to place, operate and maintain, while delivering a smart system that allows extraordinary terrain control.

He adds that the IMS also replaces current capabilities that will cease to be available with the implementation of the Bush administration's new National Landmine Policy, slated to go into effect in 2010. The policy calls for halting use of all persistent landmines after 2010 and, between now and then, developing alternatives that incorporate self-destructing or self-deactivating capabilities. With low-rate initial production scheduled for fiscal year 2009, and

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*The IMS dispenser module carries four sensor fuzed kill mechanisms and four miniature grenade launchers. It takes less than five minutes to set up.*

fielding anticipated in 2010, IMS will be in full compliance with this humanitarian landmine directive.

"The key element of the IMS program is the disciplined system-engineering approach ... always maintaining a focus on the warfighter's requirements," says Finneral. "[Our] design and integration capability was the differentiator in developing this solution. Along with our partners—Northrup Grumman for command/control and support to Future Combat System integration, IIT for communications integration expertise, and BAE for advanced sensor technology and signal processing—we have come up with a real solution, to a real challenge. We understand what the warfighter needs. ... We've met this challenge."

"Current [sensor technology] capabilities—such as those found in IMS—are an improvement over what was used in early systems," says Twohig. "It's an evolution, rather than breakthrough technology. It builds on what has worked in the past and expands on our views of what could be improved. For example, we're able to do so much more with processing of data."

A true force multiplier, IMS links sensor to shooter to shorten response times. Its operational concept is both simple and cost-effective, bringing improved engagement effectiveness, greatly enhanced situational awareness, reduced soldier workload and improved command-and-control communications to the warfighter.

"Our customers are, very specifically, the warfighters," says Lord. "With IMS, the Army will have a new capability that protects our soldiers on the battlefield and gives them a significant edge. That's our most important goal." ★